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**National Energy Board**

# ***Protection of the Environment – Pipelines***

*Environmental matters are of major concern to the National Energy Board in considering applications for certificates to construct oil or gas pipelines. This bulletin explains how the Board deals with environmental protection during and after pipeline construction.*


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## PROTECTION OF THE ENVIRONMENT – PIPELINES

### Introduction

The protection of the environment is a major concern of the National Energy Board in the construction and operation of oil and gas pipelines. This information bulletin explains how the Board deals with this concern during pipeline construction and operation.

In reviewing an application to construct an oil or gas pipeline, the Board is required by its Act to consider any matter of public interest that may be affected by the granting or the refusing of the application. The potential impact of a project on the environment is usually considered such a matter. In keeping with the public interest, the Board requires that certain information be included in applications to build pipeline facilities. The Board has also established procedures to minimize impact on air, land, water and on animal populations during pipeline construction and operation.

### 1. Environmental Assessment

The construction of pipelines is normally carried out with due regard for the environment, but if poorly planned and inadequately monitored, can cause a variety of adverse impacts. For example, in the case of agricultural lands, loss of topsoil, soil compaction and drainage alteration are of particular concern. Construction across watercourses can lead to siltation of fish spawning areas and damage to other sensitive aquatic habitats. The clearing of vegetation on the right-of-way can adversely affect wildlife habitats. Constructing pipelines across unstable slopes or areas of permafrost without special precautions can result in erosion or ground instability.

The Board requires that the following information be included in an environmental impact assessment when a company applies for a certificate to construct a pipeline:

1. a comprehensive description of the project;

2. a description of alternative routes, the route preferred by the company and the rationale for the selection of the preferred route;
3. a description of the environment in the region through which the pipeline is to be built;
4. an assessment of the potential impact of the project;
5. a description of the various measures proposed to avoid or minimize the impact; and
6. an assessment of the long-term impact of the project on the land and water and on the wildlife and fish populations of the region.

The Board is responsible for assessing and reviewing all aspects of pipeline projects under its jurisdiction. The Board's public hearing process focusses on the applicant's position and undertakings with respect to environmental matters as well as on other parties' views on the Applicant's position and undertakings. The hearing process also provides an effective forum for the public, special interest groups and other parties to express their concerns about the potential impact of a project on the environment.

To deal effectively with environmental matters, the Board's staff includes experienced specialists who are responsible for:

1. assisting the Board in assessing the adequacy of the impact analysis and the mitigative measures to be adopted on a proposed project;
2. assisting the Board in exercising its regulatory role with respect to environmental matters, by carrying out systematic inspection and monitoring during and after construction of pipelines and related facilities; and
3. providing the Board with advice on environmental issues.

A number of methods, which begin at the earliest stages of project development, are

available to minimize possible adverse environmental impacts. The first step occurs at the route selection stage. Companies are encouraged, when selecting a route, to avoid sensitive areas for wildlife, plants and fish, wherever possible. By carrying out careful route selection studies, impacts on those sensitive areas can be reduced during pipeline construction and operation.

Given the factors that must be considered and the choices that must be made during the route selection process, it may not be possible to avoid all sensitive areas. Because most biological processes and many land use activities occur seasonally, it is often possible to lessen such impacts by the careful scheduling of construction.

Companies are encouraged to avoid wherever practical areas of significant concern through careful route selection and construction timing. In that way, potential difficulties during construction and operation, and thus ultimate reliance on special mitigation and restoration practices, are minimized. If sensitive areas or periods of the year cannot be avoided, the Board requires companies to implement special precautions, through mitigation or restoration, to minimize adverse impacts.

The nature of the Board's work can be illustrated by highlighting a selection of the wide variety of projects that it has considered in the past several years and is likely to have to deal with in the next few years. For example, in the mid-70's the Board dealt with a number of competing applications to construct a natural gas pipeline in the Canadian north. Significant environmental issues associated with such northern projects often concern fish and wildlife resources, archaeological sites, permafrost and ground stability, and river crossings. Important wildlife issues associated with the northern gas pipeline proposals included potential adverse effects on the calving success of the Porcu-







pine caribou herd on the Yukon coastal plain, waterfowl nesting in the Mackenzie Delta, barren-ground grizzly bear denning on Richards Island and beluga whale calving in Shallow Bay.

In mountainous areas, the range of Dall sheep and mountain goats was a major concern, as was the fish habitat in many watercourses. Most adverse impacts could be minimized, however, by routing the pipeline to avoid sensitive habitats, by scheduling construction during the least-sensitive times of the year, or by implementing suitable mitigation and restoration procedures.

A pipeline has been built by Interprovincial Pipe Line Limited (NW) to transport crude oil from Norman Wells, N.W.T., southward along the Mackenzie Valley to a terminal at Zama in northern Alberta. The company had to make special efforts to minimize impacts through careful routing and scheduling of construction during the winter to prevent degradation of permafrost due to vegetation removal on certain sensitive slopes and river banks; it had to skirt raptor nesting areas along the Mackenzie Valley; and take other measures to keep the potential adverse effects of pipeline construction and operation on the fish and wildlife resources of the Mackenzie Valley at as low a level as possible.

To prevent thawing and slumping of ice-rich slopes, IPL(NW) applied a thick layer of wood chips to the ground surface to act as insulation as part of right-of-way restoration. To protect raptors during the nesting season, exclusion zones were defined around nesting areas to minimize the disturbance to birds by aircraft or construction activities. Special precautions were taken during construction to maintain flows in streams likely to contain overwintering fish and to minimize disturbance to wildlife in their wintering areas. The company also intends to monitor slope stability and wildlife populations after construction to determine whether the pipeline has resulted in any adverse impacts.

In the case of the proposed Arctic Pilot natural gas liquefaction project on Melville Island in the eastern Arctic, the major environmental issues concerned the potential effects of ship noise and icebreaking in

Lancaster Sound on the important marine mammal and seabird populations found there. The project proponent chose shipping routes and schedules that would avoid areas of environmental concern wherever possible and would minimize vessel movements during critical times of the year.

Future northern projects, such as the Polar Gas pipeline and a possible Mackenzie Valley oil pipeline, both of which are intended to transport northern hydrocarbon resources to southern markets, are likely to involve similar environmental issues. The Board's experience with northern projects will help in its assessment of those projects to ensure that, if certified, they will be built and operated in an acceptable way.

A number of pipelines are situated in southern Ontario and the St. Lawrence River valley. Those pipelines include Interprovincial Pipe Line's Sarnia to Montreal oil pipeline, TransCanada Pipelines' main gas pipeline in southern Ontario and the North Bay Shortcut along the Ottawa valley in eastern Ontario, as well as the Trans Québec & Maritimes pipeline which carries gas to Quebec City along the St. Lawrence River valley.

The Board has had, therefore, a great deal of experience in assessing the impacts of projects in southern Canada. Important environmental issues associated with pipeline projects in southern Canada include the protection of agricultural lands, particularly the sensitive clay soils found in southern Ontario and southern Quebec, the minimization of impacts on fish and wildlife habitats such as fish spawning areas and deer yards (overwintering areas), and on resource and land use activities such as forestry and recreational activities.

Many methods are available to minimize the adverse effects of pipeline construction on agricultural lands. Wherever possible, routes are chosen to avoid particularly sensitive areas such as fields with tile drainage or with soil types susceptible to damage. Construction is usually scheduled during the dry summer months or the winter when soil damage is less likely to occur. By storing topsoil separately from subsoil during construction, soil fer-

tility can be maintained. Any soil compaction that occurs as a result of construction activities can be alleviated by deep tillage. As with northern projects, most impacts on fish and wildlife habitats can be avoided by proper routing and construction timing.

Canada's energy future will inevitably include the development and exploitation of offshore hydrocarbon resources and possibly the export of natural gas or oil overseas. The Board has considered a number of applications for marine facilities in the past, such as the proposed LNG terminal at Port Simpson Bay, near Prince Rupert, British Columbia, and a proposed LNG regasification plant at Lorneville, New Brunswick, on the Bay of Fundy. Neither of those projects has proceeded yet. LNG terminals involve construction of wharf and loading facilities, and a major concern is the potential effect of dredging and filling on marine habitats, particularly in shallow, near-shore waters.

Adverse environmental effects resulting from construction of LNG and other facilities can be minimized through careful site selection. Where sensitive habitats cannot be avoided, construction must be scheduled during the least-sensitive periods of the year. Sediment control devices can also be used during construction to prevent silt from contaminating valuable habitats. A specific concern with the proposed regasification plant in New Brunswick was the possible effect of the cold-water discharge from the plant on the distribution and movement of marine resources. To avoid such impacts, the Board would have required the proponent of the project to design the cold-water discharge in such a way that the cold-water plume would not adversely affect local marine resources.

With the possibility of future development of offshore oil and gas resources, in particular the Hibernia and Venture fields off Canada's east coast, environmental issues similar to those which arose during the assessment of past coastal project applications will have to be considered. Those concerns will probably include determining the effects of possible oil spills on marine habitats and organisms, the potential for interference with fishery resources







and the fishing industry, and possible adverse impacts on the shallow and biologically rich near-shore area.

## **2. Environmental Inspection and Monitoring**

An important goal of the Board during construction is to ensure that work proceeds safely and with minimal adverse environmental effects.

The Board uses two means of ensuring that companies comply with applicable environmental requirements and effectively deal with any unforeseen problems that may arise as work progresses. First, the pipeline company must have full-time inspectors on site to oversee all of the activities of contractors and to ensure, among other things, that the requirements with respect to environmental matters are being properly fulfilled. Second, Board inspectors periodically visit the project to monitor the condition of the right-of-way and any other relevant matters, and to help resolve any unanticipated difficulties. The intensity of Board inspection is normally dependent on the amount of concern associated with the particular project.

The Trans Québec & Maritimes pipeline was built in Quebec through valuable agricultural land and Board inspectors monitored pipeline construction to ensure that the company implemented measures such as topsoil stripping and separation, subsurface drainage repair and post-construction tillage.

On the Interprovincial Pipe Line Limited (NW) pipeline project in the Northwest Territories, Board inspectors ensured that overwintering wildlife was not being harassed by construction personnel, that buffer zones around raptor nests were respected, and that adequate water flow was being maintained in streams containing overwintering fish species. Board inspectors also ensured that the vegetative mat was not damaged by construction vehicles.

When dealing with Westcoast's gas pipeline construction projects in mountainous areas of British Columbia, Board inspectors ensured that activities such as pipe stringing and trenching did not block wildlife movements. Construction techniques for slopes, designed to prevent rockslides and

slumping, had to be adhered to. Stream crossings were scheduled to minimize impact on fish resources, on salmon in particular. All such construction activities are monitored by Board inspectors.

Once construction has been completed, and the Board has authorized the start of operations of the facility, the company is required to submit a post-construction environmental report. The purpose of that report is:

1. to provide a list of the environmental issues that arose prior to the pipeline being put into operation and the mitigative actions that were taken to deal with them;
2. to identify any issues arising since the pipeline was put into service; and
3. to provide a summation of any matters not fully resolved at the time of submission of the report, and the actions the company proposes to resolve those issues.

The Board requires a company to monitor the right-of-way after construction has been completed to ensure that disturbed areas are properly restored. The success of any restorative action taken following construction is normally documented in a company's environmental monitoring reports. Those reports are normally submitted at the end of each growing season for two years following the completion of construction. The purpose of those reports is similar to that of the post-construction environmental report, except that ultimately no issues should remain unresolved. If restoration of a right-of-way is not satisfactory after two years, the Board will require a company to monitor and take action in specific areas for an extended period.

A company is required to establish and maintain manuals and procedures that specify monitoring and surveillance programs for the protection of the environment. A company routinely monitors its pipeline right-of-way looking for evidence of leaks and for areas where changes in terrain characteristics could result in damage to the integrity of the pipe or to the environment.

At regular intervals, the Board inspects operating pipeline right-of-ways to ensure

that the company is following environmental protection procedures.

## **3. Landowner Complaints**

Landowners who feel that the activities of a pipeline company are adversely affecting their properties can bring their concerns to the Board's attention. The Board will then investigate the complaint. If the complaint is valid, the Board will inform the pipeline company of the problem, request that it contact the landowners concerned, and report to the Board on the outcome of the discussion, including any action proposed to resolve the problem.

## **4. Accidental Releases of Products Carried by Pipelines**

A company must establish procedures that are to be implemented in the event of an emergency. The Board requires detailed reports of all incidents involving personal injury or fatality, or a leak, break, fire, explosion, or failure on or malfunction of pipelines under its jurisdiction. The Board may also undertake a public inquiry into any such occurrence to determine the cause and evaluate the emergency, safety and environmental protection procedures in effect at the time of the incident.

When an incident occurs on a pipeline, the operating company must immediately report it to the Board. Upon completion of repairs and site restoration, the company submits a detailed report on the incident. That report includes the location of the accident, the extent of the damage, the amount of product lost, and the containment, clean-up and restoration procedures implemented.

Depending on the nature and severity of the incident, the Board's inspectors may survey the accident site to assess the extent of any impact. The inspectors monitor the restoration activities of the company, and report to the Board on the condition of the accident site.

Once restoration has been completed, Board inspectors monitor the site on a regular basis to ascertain if any long-term problems have developed. Should such a problem be evident or a landowner complaint be received, the company is requested to implement any additional





measures considered necessary to correct the problem.

### **5. Abandonment**

A company may not abandon the operation of a pipeline without Board approval and in turn, the Board must ensure that the abandonment of a pipeline does not result in any adverse impact. A company must also prepare restoration and rehabilitation plans for those areas where land has been disturbed as a result of the removal of above-ground facilities (pump or compressor stations, meter stations, etc.) or by any excavation for pipe removal or for pipe sealing. The Board reviews a company's restoration plans to determine whether those plans will be adequate and to ensure that adverse impact will not result over the long term from abandoning a facility.

### **6. Conclusion**

The Board recognizes the extensive environmental impacts that large energy pro-

jects can have on Canadians and on their private and public resources. To ensure those impacts are avoided or minimized, the Board draws from many areas of expertise for a complete project review, establishes standards of performance for project implementation, regulates field construction practices, and monitors post-construction and operational activities.

In a continuing effort to maintain high standards of environmental protection, the Board encourages participation in discussions with the general public, other provincial and federal government departments and agencies, and oil and gas transmission companies.

Within the Board, concern for the protection of the environment plays a major role and receives a high profile in the review of applications.

The Board is aware that changes and improvements in environmental protection procedures are constantly occurring and

regularly updates its requirements and procedures to reflect those new developments.

While the Board is the prime federal agency charged with assessing and reviewing all aspects of pipeline projects under its jurisdiction, protection of the environment is also the responsibility of a number of other federal and provincial agencies and government departments such as Environment Canada, Indian and Northern Affairs, Fisheries and Oceans and the various provincial environment ministries. The Board maintains a dialogue with those bodies to keep them aware of the Board's regulatory process and to coordinate practices and standards used among regulators. In keeping an overview of environmental affairs, the Board participates in environmental assessment conferences, in the delivery of technical and policy papers, and in the cooperative establishment of common standards and practices.





**PREVIOUS  
INFORMATION BULLETINS**

Bulletin No.	Title	Release Date
1	Route Approval Procedures	September 1983
2	The Public Hearing Process	October 1983
3	Non - Hearing Procedures	November 1983
4	How to Intervene	January 1984
5	N.E.B. Publications	February 1984
6	The Board's Approach to the Regulation of Tolls and Tariffs under Part IV of the N.E.B. Act	March 1984
7	The N.E.B. Library	May 1984
8	Electric Power: A Compendium of Terms	May 1985

